SECTION

I

AMA Overview

Preface

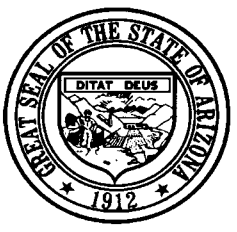
Section I of the Third Management Plan provides an overview of the Arizona Department of Water Resources' (Department) water management approach; a description of the physical conditions, hydrology, and water resources of the Santa Cruz Active Management Area (AMA); and a detailed description of the characteristics of various water use sectors within the AMA. The physical water resources data presented in Chapter 2 and the historic water use and associated water use trends described in Chapter 3 provided the Department with important information from which it analyzed water supplies and demands. Information presented in this section was also used in developing water management programs which are presented in Section II and the future conditions and directions presented in Section III.

In Section I, the Department intends to provide the reader with a better understanding of the management approach, the water resources, and the water use characteristics of the Santa Cruz AMA. Such an overview is necessary to better appreciate the reasoning, perspective, and methods being used by the Department to develop a long-term water management strategy for the Santa Cruz AMA, with particular emphasis on the third management period (2000 to 2010).

CHAPTER

1

Water Management Approach



1.1 CHAPTER ORIENTATION

This chapter describes the goals, objectives, and contents of the Third Management Plan within the context of the Arizona Department of Water Resources (Department) and the Groundwater Code (Code). It also provides an overview of the Santa Cruz Active Management Area (AMA) and the conditions that make it unique among the five AMAs. The following topics are discussed:

- Arizona Department of Water Resources' mission
- Overview of the Code and some of its key provisions
- A discussion of the safe-yield concept and Santa Cruz AMA management goals
- An institutional overview of the Santa Cruz AMA
- The principles, objectives, and content of the Third Management Plan
- Emerging challenges for the Santa Cruz AMA

1.2 THE ARIZONA DEPARTMENT OF WATER RESOURCES

The Department was created by the 1980 Groundwater Code to manage the water resources of Arizona. The Department administers state laws, explores methods of augmenting water supplies to meet future demands, and works to develop public policies that promote efficient use and equitable allocation of available water supplies. To secure long-term water supplies for Arizona, the Department oversees the use of surface water and groundwater in the state and represents the state's interests in interstate and federal issues. The mission of the Department is:

> *To ensure a long-term, sufficient and secure water supply for the state; to develop public policy which promotes efficient use and equitable distribution of water in an environmentally and economically sound manner; and, to promote the management of floodplains and dams to reduce loss of life and damage to property.*

1.3 THE ARIZONA GROUNDWATER CODE

In 1980, Arizona made a commitment to the long-term management and conservation of its limited groundwater supplies through the passage of the Code, which is the cornerstone of Arizona's water management efforts. In general, the goals of the Code are to eliminate severe groundwater overdraft in areas of the state where groundwater supplies have been rapidly diminishing and to provide the means for allocating Arizona's limited groundwater resources to most effectively meet the state's changing water needs. Goals to maintain safe-yield and prevent local water tables from experiencing long-term declines were established for the Santa Cruz AMA due to local hydrology and water resource management issues. To achieve this dual goal, the Code authorizes the Department to manage all water withdrawn from wells, other than stored water, in the Santa Cruz AMA.

The Code limits withdrawals of groundwater within AMAs to holders of grandfathered rights, service area rights, groundwater withdrawal permits, and to small domestic water users. Under the Code, water uses existing in 1980 were allowed to continue within the limits established under a new water rights system, and new uses were required to be consistent with the management plans and goals of the AMAs. Readers who are not familiar with the different types of groundwater rights established by the Code are encouraged to read the Glossary of Terms attached as a supplement to the management plan. The Code also contains provisions to limit water use through conservation and the use of renewable water sources. The full text of the Code can be found on the following Web site: www.azleg.state.az.us under Title 45, Water.

1.3.1 The Groundwater Problem

The Code was enacted in response to serious water level declines in the aquifers in central and southern parts of the state. Groundwater overdraft in Arizona has resulted in the lowering of groundwater levels by as much as 600 feet in some locations. In some areas, groundwater depletion has made it economically infeasible to pump water, has caused the lowering and cracking of the land surface (subsidence), and has resulted in water quality problems due to the migration of contaminated water and general deterioration of aquifer water quality with depth. Long-term overdraft of groundwater supplies will exacerbate these problems.

1.3.2 Provisions of the Groundwater Code

The regulatory provisions of the Code are focused primarily on areas of the state that have been designated as AMAs. These areas are located where competition for water supplies is most severe, primarily in the central and southern parts of the state. Statewide, there are provisions addressing well drilling, well registration, and construction requirements; water supply adequacy requirements for new subdivisions; and limitations on transportation of groundwater across watershed boundaries. The Santa Cruz AMA has additional requirements contained in this plan for well spacing.

Within AMAs, the Code established a new groundwater rights system which strictly limits groundwater withdrawals; prohibits the development of new irrigated farmland; requires new subdivisions to have long-term, dependable supplies; and requires measuring and reporting of groundwater withdrawals. As explained at appropriate points in this management plan, many of these provisions apply to right holders who withdraw water from a well in the Santa Cruz AMA.

Management goals are established for each AMA, and a series of five management plans containing mandatory conservation requirements for industrial, municipal, and agricultural water users must be developed. Other programs within AMAs include conservation assistance, augmentation, and monitoring of the water supplies.

The Code also established Irrigation Non-Expansion Areas (INAs). Within these areas there can be no new irrigated land and owners of large wells are required to meter their water use and file annual reports with the Department. Otherwise, groundwater management in INAs is not highly structured.

1.3.2.1 Creation of the Active Management Areas and Irrigation Non-Expansion Areas

Upon enactment of the Code, four AMAs were established in Phoenix, Tucson, Pinal, and Prescott. In 1994, the Arizona legislature enacted Senate Bill 1380 and thereby established the Santa Cruz AMA. In that legislation, the legislature recognized that the international nature of water management issues facing the Upper Santa Cruz River Basin differed significantly from the other basins of the Tucson AMA, which, until the enactment of Senate Bill 1380, included this basin. The legislature specifically noted that the hydrology of the basin required coordinated management of surface water and groundwater. The legislature also recognized the desire of the water-using community of the Upper Santa Cruz River Basin to create the Santa Cruz AMA in order to participate in local water resource management and binational coordination efforts. A.R.S. § 45-411.04.

In recognizing that the hydrology of the Upper Santa Cruz River Basin requires a "coordinated management of surface water rights and groundwater rights" to meet the water management goals of the area, the legislature set a new course for water management in the Santa Cruz AMA. Unique among the AMAs in Arizona, the Santa Cruz AMA management programs are designed to address all water withdrawn from a well, whether that water is groundwater or surface water, pursuant to A.R.S. § 45-566. The legislature also specified that the creation of the Santa Cruz AMA, and this coordinated management

of surface and groundwater rights was not to "affect the definition of, or rights to, the surface waters and groundwater within this state." A.R.S. § 45-411.04(C).

Boundaries of the AMAs are based primarily on groundwater basin divides, but they take into account water use patterns as well. The Code also established two INAs: Douglas and Joseph City. A third INA, Harquahala, was designated by the director in 1982. Figure 1-1 shows the location of the five AMAs and the three INAs. Figure 1-2 shows the boundaries and major features of the Santa Cruz AMA. The Douglas INA is managed from the Tucson AMA office. The Joseph City and Harquahala INAs are managed from the Phoenix AMA office.

1.3.2.2 The Management Goals

For three of the AMAs, Prescott, Tucson, and Phoenix, the management goal to be reached by the year 2025 or earlier is safe-yield. The attainment of this goal is expected to occur incrementally over the five management periods. Maintaining the safe-yield goal beyond 2025 may become more and more difficult over time as demand increases due to municipal and industrial growth and renewable supply surpluses decrease.

In the Pinal AMA, where a predominately agricultural economy exists, the goal is to protect the agricultural economy as long as feasible and preserve water supplies for future non-agricultural purposes. In order to address the unique hydrologic nature of the Santa Cruz AMA, the goal requires the AMA to maintain a safe-yield condition and prevent local water tables from experiencing long-term declines.

Safe-yield, as defined in the Code, means "to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial groundwater recharge in the active management area." A.R.S. § 45-561(12). The volume of groundwater that can be withdrawn while maintaining a safe-yield condition in the AMA will not be a fixed amount; it will change due to annual variations in incidental recharge, natural recharge, and safe-yield recharge. The Department uses tools such as hydrologic models, water budgets and an analysis of water table level changes across the entire AMA to help determine an AMA's status relative to its safe-yield goal.

The goal of preventing long-term declines in local water table levels is defined in the Santa Cruz AMA as maintaining a target water level, consistent with state surface water and groundwater laws which could vary by hydrologic segments, that on average must be maintained subject to natural fluctuations. If long-term water level trends (after adjusting for stored credits) show declines for a particular hydrologic segment, natural or artificial recharge, and potentially a reduction in water withdrawals will have to occur to allow the local water table level to recover and reattain its target level. If long-term local water table levels rise (after adjusting for stored credits) above the target due to variations in incidental recharge and natural recharge, water withdrawals may be increased. Evaluations of the impacts of withdrawals on long-term local water table levels made at regular intervals will help ensure long-term water table level stability.

Information from annual water use reports is used to estimate the volume of water withdrawals, water stored, and recovered water in an AMA. Water budgets are constructed to illustrate the total supply and demand picture. Because the Santa Cruz AMA goal is to maintain safe-yield conditions, water levels need to be monitored in the context of a hydrologic model to ensure that the AMA goal is maintained and to understand the effects of stored water. Hydrologic models can be used to predict changes in water levels based on projected water withdrawals and credit recovery patterns and to verify assumptions in the water budget.

Safe-yield is achieved on an AMA-wide basis; the Code does not recognize localized achievement of safe-yield. The amount of water withdrawn under safe-yield conditions is not allocated on a subbasin or local

basis. It is anticipated that under safe-yield conditions on an AMA-wide basis some areas may be depleted, some areas of active recharge may be in surplus, and other hydrologic segments will be required by the Santa Cruz AMA goal to achieve a localized balance between the amount of water recharged and withdrawn.

Since the development of the Second Management Plan, new information has become available regarding the physical availability and distribution of water supplies. For example, recent publications by the United States Geological Survey (USGS) have heightened awareness of the potential for land subsidence in some AMAs. This improved understanding of the risks associated with ongoing pumpage in certain areas brings a new perspective to safe-yield. It is clear that a more site-specific, local resource management approach is needed in parts of other AMAs in addition to the Santa Cruz AMA. Additional tools may be required to develop a more resource-based, localized water management program in the other AMAs.

During the third management period, a critical area management strategy will be evaluated for the other AMAs which establishes additional water management goals for specific geographic areas within the AMA. These goals may relate to mitigation of subsidence, water supply reliability, water quality management, implementation of Indian water rights settlements, or other groundwater supply-related considerations. The goal of the Santa Cruz AMA already provides for local management of water table levels. It is possible that other areas of the AMA may be identified for critical management during the third management period.

1.3.2.2.1 Local Water Tables

The Santa Cruz AMA was given a dual goal by the legislature. The first component of the management goal is to maintain safe-yield on an AMA-wide basis. The second component is to prevent local water tables from experiencing long-term declines. This component of the goal requires careful consideration of very localized conditions (described in chapters 2, 3, and 8) in examining water management issues, in comparison to the AMA-wide nature of the safe-yield component.

The Department believes that practical considerations help define this goal. An extreme view of this goal would require strict regulation of water levels everywhere in the AMA. However, the Department believes such universal controls are not needed at this time and that water interests within the Santa Cruz AMA would not welcome micro-management of water resources throughout the entire AMA. On the other hand, viewing this goal as requiring only an AMA-wide balance would render it indistinguishable from the safe-yield component of the management goal.

After evaluating a number of possible local water management approaches, the Santa Cruz AMA community has elected to set target water levels that can vary by hydrologic segments, which must be maintained on average, subject to natural fluctuations. The target water levels must be consistent with state surface water and groundwater laws. Based on input from local water interests and because the most critical water management issues in the AMA center upon the Younger Alluvium of the Santa Cruz River, the Department recommended that its water management efforts should concentrate on the Younger Alluvium of the Santa Cruz River and those tributaries and formations, including certain Older Alluvium formations, that contribute water to the Younger Alluvium. Initial management efforts are best focused on these Younger Alluvium areas which are: (1) subject to competing multiple use objectives, (2) most sensitive to changes in water levels, and (3) relied upon for most of the region's water supply.

During the third management period, the Department will work to adapt its regulatory programs for the Santa Cruz AMA within the framework established in the AMA's management goal.

1.3.2.3 Management Plans

To achieve the management goal(s) for each AMA, water conservation and management requirements are established in each of five management periods. The five management periods are as follows:

First Management Period:	1980-1990
Second Management Period:	1990-2000
Third Management Period:	2000-2010
Fourth Management Period:	2010-2020
Fifth Management Period:	2020-2025

Requirements for each management period are described in separate management plans prepared for each AMA. The management plans for the Santa Cruz AMA must include water conservation requirements for "...all non-irrigation uses of water, other than stored water, withdrawn from a well," (A.R.S. § 45-566.A(2)); a water quality assessment and management program; an augmentation and recharge program; conservation assistance programs; and other management programs that define how the AMA will achieve its management goals.

The management plans for all the AMAs must also quantify the volume of the groundwater right for agricultural and municipal users. For example, in the case of Irrigation Grandfathered Rights, the right established in the Code is to irrigate particular acres of land that were historically irrigated. The volume of water that may be applied to that acreage, the "water duty," is defined in the management plans. Similarly, service area rights for municipal users are not quantified in the Code but are quantified through the gallons per capita per day program in the management plan. Because agricultural and municipal water users in the Santa Cruz AMA withdraw water from wells, these provisions of the Code and management plans are applicable.

In each successive management period, the preparation of a management plan provides the Department and AMA water users with the opportunity to analyze the effectiveness of previous water management efforts and address water management issues in the AMA. Adjustments in water management strategies and conservation requirements are made in each successive plan to help achieve management goals.

The First Management Plan was the first step toward a comprehensive and effective management program. The plan initiated conservation programs and focused attention on important water management issues. The Second Management Plan expanded on the conservation programs of the First Management Plan and integrated water augmentation into the AMA management strategy. The Second Management Plan placed a strong focus on evaluation of conservation potential and implementation of water conservation measures to achieve cost-effective levels of efficiency in water use. New programs for conservation and augmentation assistance were included as well.

Even after the implementation of two management plans, water management problems persist in all five AMAs. Because the water users and right holders of the Santa Cruz AMA were regulated under the Tucson AMA First and Second Management Plans, the Third Management Plan will be the first prepared specifically for the Santa Cruz AMA.

The Third Management Plan establishes water management strategies that include water conservation, augmentation, recharge, and water quality management by the agricultural, municipal, and industrial sectors to help achieve the AMA goals. The Department recognizes that the Third Management Plan is the initial step in water management for the Santa Cruz AMA. The development of additional rules and new legislation will be needed to address the unique character of the Santa Cruz AMA and achieve the AMA's dual goal.

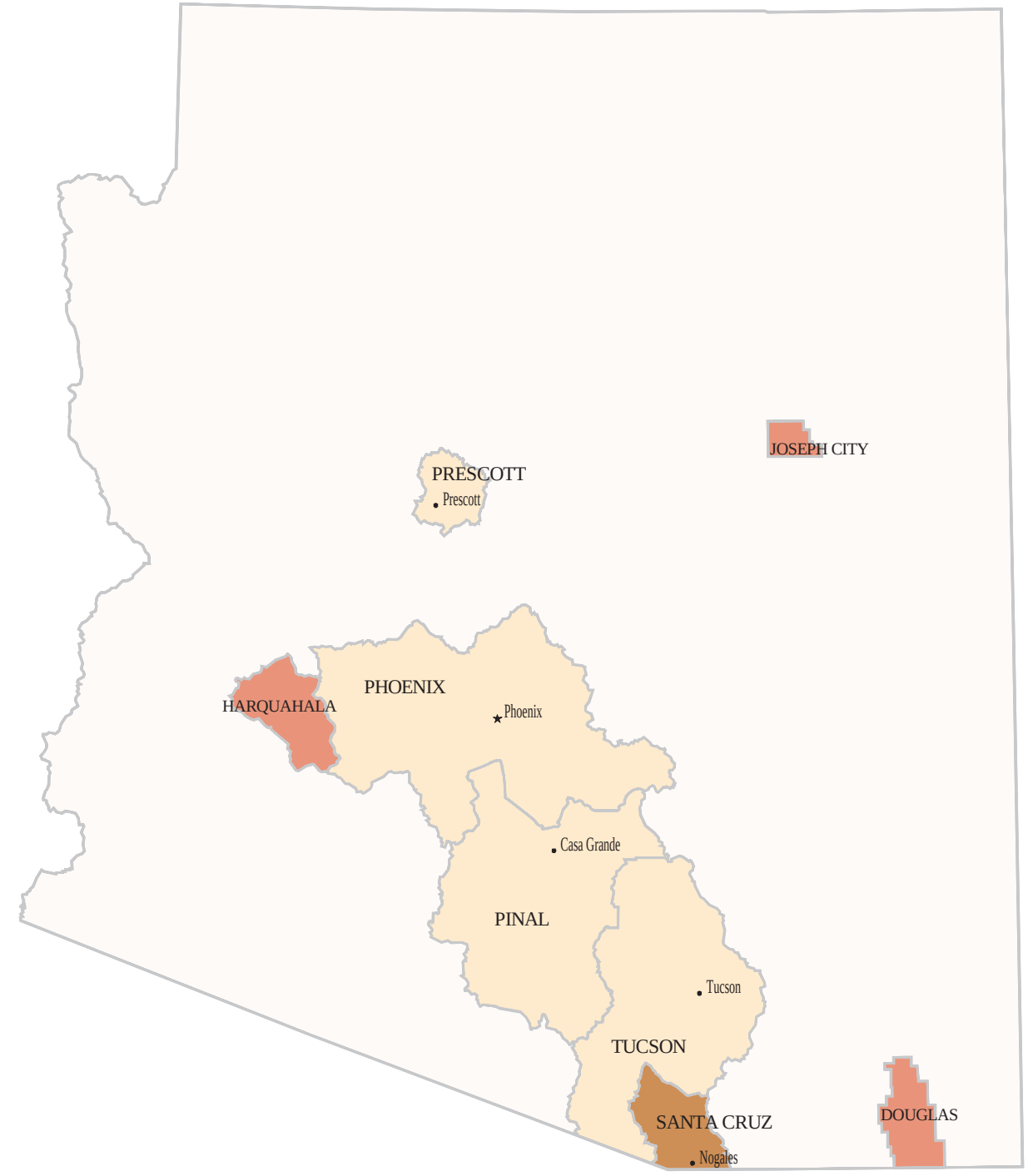
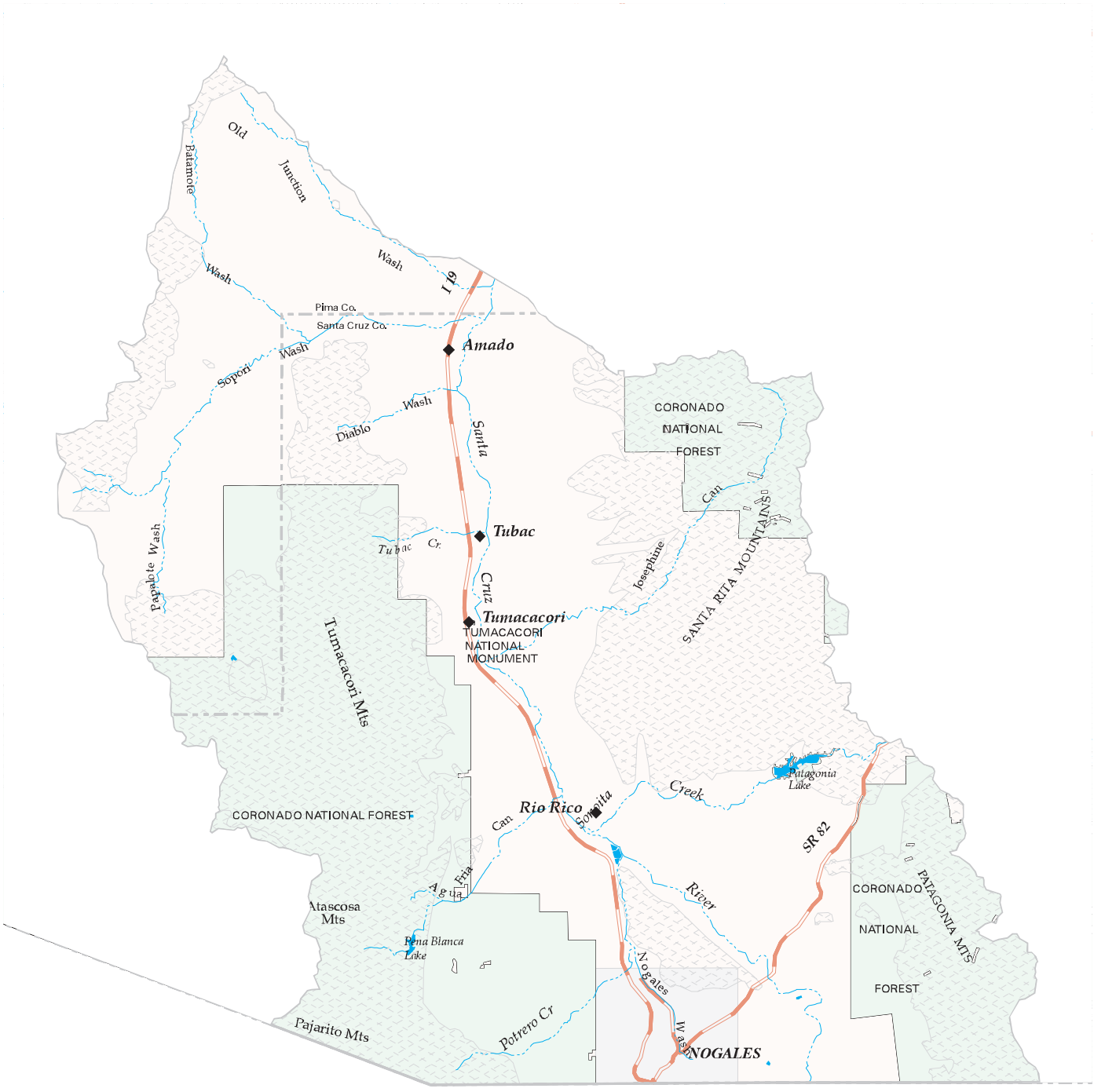


Figure 1- 1

Active Management Areas
and Irrigation Non-Expansion Areas

ORIGINAL SOURCE
Arizona Department of Water Resources
Geographic Information System



Santa Cruz AMA
National Forest
Incorporated Areas
Lakes
Hardrock
Highway and Roads
Counties
Streams and Rivers
Cities or Towns

Figure 1- 2

Santa Cruz AMA

0 1 2 3 4 5
Miles
North

ORIGINAL SOURCE
Arizona Department of Water Resources
Geographic Information System

Because the Third Management Plan is the first prepared specifically for the Santa Cruz AMA, water conservation requirements contained in this plan are similar in structure to those established in the Second Management Plan. Changes in the Third Management Plan address comments received from regulated water users, additional water management issues, and local water management concerns. The Third Management Plan describes the developing role the Department and the water users must play in meeting local, regional, and statewide water management objectives. Achievement of the AMA goals and other water management objectives will require community-wide support and commitment and the development and adoption of rules and legislative changes.

1.3.2.4 Assured Water Supply Program

The Code prohibits the sale or lease of subdivided land in an AMA without the demonstration of an assured water supply. The Assured Water Supply Program (AWS Program) was instituted in 1980, but substantially strengthened in 1995 with adoption of the Assured Water Supply Rules (AWS Rules). Under the AWS Rules, new development within an AMA must demonstrate that sufficient water supplies of adequate quantity and quality are available to meet proposed uses for 100 years. The AWS Rules require the utilization of these supplies to be consistent with the AMA goal(s). Only after demonstration of sufficient water supply can a development be approved for sale to the public. Because the AWS Rules were being adopted at the same time that the Santa Cruz AMA was being created, consistency with AMA goal criteria for the Santa Cruz AMA are not included. After numerous discussions with the Santa Cruz AMA community, the Department drafted the Santa Cruz Active Management Area Management Goal and Program Implementation Concept Paper in July, 1997. This paper explores interpretations of the management goals, water management issues, and water management program implementation concepts for the Santa Cruz AMA. Currently, the Department is drafting AWS consistency with management goal rules for the Santa Cruz AMA, based on the concept paper and additional discussions with the community that have occurred since the concept paper was written.

The AWS Rules apply to developers who seek a Certificate of Assured Water Supply (Certificate of AWS) for an individual subdivision and to water providers seeking a Designation of Assured Water Supply (Designation of AWS). A Designation of AWS results from a demonstration that there are adequate water supplies available to the provider to meet current and future demands of the customers currently on their system, and the demands of customers they have committed to serve, for 100 years. The water supplies used to demonstrate an assured water supply may include surface water and effluent, and in some AMAs may also include imported groundwater, credits from extinguishment of groundwater rights, a quantity of allowable groundwater use specified by the AWS Rules, or water stored pursuant to an underground storage permit. The AWS Program plays a key role in achievement of the management goals since it requires that the water use sector with the greatest potential for growth in the AMA carefully plan and prepare for future current and committed water demands to be met in a manner that will result in the maintenance of safe-yield conditions and prevention of long-term declines in local water table levels.

1.3.2.5 Revisions to the Groundwater Code

Since 1980, the Code has undergone numerous changes to address emerging water management issues. The creation of the Santa Cruz AMA from a portion of the Tucson AMA in 1994 established for the first time the ability of this region to address its own unique water management problems, including hydrologic conditions and international issues. In addition, sections have been added to the Code that limit the use of water in artificial lakes, address underground storage and recovery of water, limit transfers of groundwater between groundwater basins statewide, establish groundwater replenishment districts and other entities designed to facilitate the use of renewable supplies, establish the water conservation assistance program, and provide alternative municipal and agricultural conservation programs. In addition, numerous changes have been made to expand or clarify previous language and deregulate small groundwater users.

Throughout this process, the fundamental concepts of allocating the right to use groundwater and planning for the efficient and economic use of water have been preserved. The Code, as comprehensive as it is, does not contain detailed instructions on how to manage water resources. Instead it provides a framework from which water management decisions are made in the AMAs. The Department and the local water users, through the development and implementation of the management plans and community-based decisions, will establish management strategies to allow for achievement of the AMA goals, while coordinating with Sonoran water management practices and objectives for the internationally shared basin, as authorized by the Arizona state legislature.

1.4 GOVERNMENTAL AND INSTITUTIONAL SETTING

Water management activities within the Santa Cruz AMA are carried out by a number of entities. City, county, and regional government functions include retail water delivery, flood control, wastewater management, water quality management, planning, and zoning. Several user groups, advisory committees, citizen's groups, and other organizations play significant roles in developing legislative and policy guidelines and educational programs relating to water resource use and conservation. The Groundwater Users Advisory Council (GUAC) for each AMA advises the director of the AMA and the director of the Department on issues relating to groundwater management in the AMA.

The Arizona Water Protection Fund (AWPF) was established in 1994 to provide grant monies for implementation of projects to protect or restore the state's riparian areas. The Fund may be used to purchase CAP water or effluent for riparian enhancement. The AWPF Commission oversees the grants process; the director of the Department serves as an ex-officio member on the Commission and the staff are located within the Department.

At the state level, the Arizona Department of Environmental Quality (ADEQ) develops and enforces water quality regulations. Through recent legislation (amending provisions of the Water Quality Assurance Revolving Fund (WQARF)) the Department and ADEQ jointly participate in specified activities related to protection of groundwater quality and remediation.

The Arizona Corporation Commission (ACC) regulates the activities of private water companies, particularly those related to rate-setting. The Arizona Department of Real Estate works with the Department to assure availability of water for new subdivisions.

Federal water management activities in the Santa Cruz area include the Bureau of Reclamation's involvement in regional water supply planning and participation in negotiations to provide water resources to Indian communities on behalf of the Secretary of the Interior. Additional federal water management activities include Army Corps of Engineers' Studies, the Environmental Protection Agency's Superfund program, and the National Pollutant Discharge Elimination System permit program. The USGS works independently and in conjunction with the Department in the collection and analysis of hydrologic and subsidence-related data and flood warning information.

In the Santa Cruz AMA, the International Boundary and Water Commission (IBWC) is made up of two sections, one from Mexico and one from the United States. Each section is headed by an engineer-commissioner appointed by the president of each country, who in turn receives policy guidance from respective foreign offices: the State Department for the United States and the Secretary of Foreign Relations for Mexico. The IBWC conducts studies on boundary and international water matters within its jurisdiction. In the Santa Cruz AMA, the IBWC co-owns the Nogales International Wastewater Treatment Plant, which generates an important volume of effluent. The IBWC also helps in the formal interchange of information related to transboundary water basins (Santa Cruz River and Nogales Wash). In creating the Santa Cruz AMA, the Arizona state legislature recognized the importance of facilitating binational

negotiations for coordinated management of the water resources of the Santa Cruz River. A.R.S. § 45-411.04(A).

1.5 DEVELOPMENT OF THE THIRD MANAGEMENT PLAN

Preparation of the Third Management Plan has been guided by a set of overriding principles and specific objectives. These principles and objectives and the Third Management Plan development process are described below.

1.5.1 Guiding Principles in Program Development

The Code provides the Department with a series of management tools, some of which are more effective than others. In addition to the Code, general management principles have been developed to guide the operations of the Department and preparation of the Third Management Plan. These are:

- **The authorities granted to the Department must be integrated into a coordinated strategy for meeting the management goals of the AMA.** Numerous tools are provided by the statutory structure to assist in meeting water management objectives. These tools include: (1) binational water management coordination authority, (2) water rights components of the Code, (3) assured water supply provisions, (4) underground storage and recovery provisions, (5) permitting requirements and conditions, (6) authority to develop well-spacing rules, (7) AWBA and AWPF activities, (8) conservation and augmentation assistance programs, and (9) water use reporting and enforcement authorities. All of these activities must be integrated and focused toward meeting the goals.

- **Local water management issues must be addressed as regional and statewide strategies are developed.** There must be recognition of the impacts that regional or statewide water management programs can have on local water users in the Santa Cruz AMA.

- **Effective water management must include both supply augmentation and demand management programs.** Supply augmentation includes storage of excess renewable water for future use and utilization of effluent. The demand management includes ensuring efficient water use in new development and encouraging water conservation among existing users. Demand management extends the availability of existing water supplies to serve more uses over a longer time frame.

- **Effective and efficient water management must take a long-term perspective and be both regional (AMA-wide) and local (water table levels) in scope.** The Department is responsible for ensuring that sustainable water supplies are available for future generations. Managing the water supplies to maintain safe-yield conditions on an AMA basis will help ensure water supply availability into the future. Managing local water table levels will maintain the quality of life and help preserve water availability in portions of the AMA sensitive to fluctuations in water table levels.

- **All water sources need to be included in any long-term, comprehensive water management strategy.** Because of the difficulty in distinguishing between groundwater, surface water, and effluent sources in the Younger Alluvium of the Santa Cruz River, the legislature expressly provided that all water withdrawn from wells be included in water management in the Santa Cruz AMA. Areas of the AMA outside of the Younger Alluvium are largely groundwater dependent and alternative supplies are not generally economically feasible to obtain. Water management in these portions of the AMA may be different from, but not less important than, water management within the Younger Alluvium.

- **Water users must have an integral role in management program development and implementation.** Water users with expertise in their own water use sector must play a major role in the development and implementation of water management programs in order to ensure the success of these programs.

- **Water management efforts must consider economic impacts and feasibility.** Attaining water management goals requires the expenditure of public and private funds, which must be used as effectively and efficiently as possible. Therefore, water management strategies must be developed using sound economic principles.

- **Educating the public on water issues and involving the public in developing management programs are essential to building and sustaining an effective water management effort.** It is ultimately the members of the public who are asked to commit to implementing water management strategies. It is essential to provide them with the information they need to make informed choices and the opportunity to participate in developing water management programs.

- **Water management efforts should be consistent with, and enhance, the quality of life in the community.** Social values and environmental quality considerations are integral to the development of water management approaches in Arizona. Adverse impacts on the quality of life and the potential for economic development must be avoided to the greatest extent possible.

- **The Department's water management efforts must recognize that water users, water service area customers, water providers, municipal governments, and the real estate industry are important decision-makers.** The role of the Department's programs and regulatory tools is to create a decision-making environment that results in good water management decisions and investments.

- **Water supplies available today must be used to meet the needs of the future.** Any excess supplies available during the third management period must be managed to meet growing AMA demands and provide adequate supplies during future water shortages. Underground storage of excess supplies and direct use of effluent are important components of successful water management.

- **Water management programs should provide a stable institutional framework which creates an environment of certainty in water resource decision-making.** Water users and providers must commit to, and implement, long-range plans in a world of evolving regulations. The provision of a predictable framework within which these regulations will evolve reduces uncertainty. Involvement in binational negotiations at the state level, through the Santa Cruz AMA, ensures local understanding and investment in resolution of water management issues. Local water management efforts will help provide certainty and stability. Additionally, management programs must be clearly stated and free of ambiguity, while maintaining flexibility to respond to changing conditions.

- **Water management programs should be based on the premise that future issues are unlikely to be the same as those we have encountered in the past, and that the pace of change is likely to increase.** In order to provide maximum flexibility for the future, databases must be maintained and enhanced, and tools developed to improve our understanding of the AMA hydrologic system, to identify trends early, and to test scenarios that vary from current conditions.

1.5.2 Third Management Plan Objectives

The following objectives must be achieved during the third management period:

- The Department will establish and implement Third Management Plan water conservation requirements for all non-irrigation water, other than stored water, withdrawn from a well, as equitably as possible. Conservation requirements will also be established and implemented for irrigation uses of water. A.R.S. § 45-566(A). Public acceptance and economic, technical, health, and environmental constraints will be considered when establishing these requirements. Flexibility will be provided as appropriate to address water users who, while implementing effective conservation measures, may not be able to comply with specific conservation regulations. Unique circumstances may be addressed through alternative conservation requirements designed to result in equivalent conservation or through variance or administrative review procedures provided for by statute.

- The Department will maintain conservation requirements initiated by the Second Management Plan that were effective and expand them where appropriate. The Department will recognize existing conservation efforts in setting Third Management Plan conservation standards.

- The Department will provide financial and technical assistance to implement water conservation, augmentation, monitoring, and recharge measures.

- The Department will encourage development of infrastructure that will allow use and storage of renewable water supplies.

- The Department will expand public assistance and public education efforts to reach a larger portion of the public.

- The Department will provide incentives, as appropriate, to encourage water conservation and water augmentation activities consistent with water management objectives.

- Department staff will actively participate in regional and local water management planning and cooperative projects.

- The Department will collect, analyze, and maintain data in order to provide the information necessary to identify water management issues and trends and to propose appropriate and timely solutions.

- The Department will endeavor to enhance water quality management efforts in order to preserve the quality and quantity of water available for existing and future needs.

- The Department will encourage recharge activities in areas where storage of renewable supplies will be beneficial from a water management perspective. Management of both storage and recovery activities will be required to protect future water supplies and the storage capacity of the aquifers.

- The Department will encourage coordination between the agencies that affect water policy, particularly the ACC and ADEQ.

- The Department will work with the state's political leadership, water users, and the public to identify and develop the tools and additional statutory authority necessary to achieve water management goals and objectives.

1.5.3 Third Management Plan Development Process

Development of the Third Management Plan has involved data collection and analysis, issue identification, and program development. Public participation has been an important component of the process throughout the development of the Third Management Plan.

1.5.3.1 Program Development and Implementation

This Third Management Plan is the result of a three-staged work effort which began in 1994. The first stage involved data collection and analysis culminating in development of a "State of the AMA" (SOAMA) report which was widely distributed. In the second stage, issues identified in the SOAMA report and raised by the community were addressed in issue papers describing the issue and identifying recommended alternatives. The third stage involved developing recommended alternatives into program concepts and, ultimately, into the program chapters and legal requirements presented in the Third Management Plan. Throughout preparation of the Third Management Plan, public input and technical research have been used to identify issues, objectives, and solutions.

1.5.3.2 Public Participation

Multiple levels of public input have been used in development of the Third Management Plan. The Code established a five-member GUAC for each AMA. The GUAC members are appointed by the Governor to represent the groundwater users in the area and advise the director of the Department and the AMA director on matters relating to water management within the AMA. Santa Cruz AMA staff met regularly with the GUAC to obtain member opinions and recommendations on all components of this plan. The GUAC meetings were open to the public and interested groups and individuals communicated their views and recommendations in this forum. Pursuant to A.R.S. § 45-421(1), the GUAC must comment on the proposed plan before promulgation.

Technical review was provided by committees comprised of experts on water quality, water resources, and water budgets. In the Santa Cruz AMA, the technical review of the management plan was also performed through the GUAC. Across the five AMAs, public comments were received in meetings with interested parties and during and following presentations to civic organizations and the general public. The Department's philosophy is to maximize public input on the content of the management plans to ensure that the public's concerns and ideas are adequately incorporated.

Additional public input is obtained through formal public hearings conducted after the proposed plan is completed. A.R.S. § 45-570. In these hearings the Department presents information in support of the plan and obtains comments regarding the plan. Before the plan is adopted, the director of the Department may revise the plan and must prepare a written response to the written and oral comments submitted as part of the hearings process.

1.6 THIRD MANAGEMENT PLAN CONTENT

The Third Management Plan addresses water conservation, water augmentation, water quality, and related water management programs for the years 2000 to 2010 and comprises the following five primary elements:

- Assessment of the status of water supplies and demands in the AMA
- Mandatory conservation and monitoring requirements for agricultural, municipal, and industrial water users and water distribution systems
- Water supply augmentation and recharge program
- Water quality assessment and management program

- Conservation, augmentation, and monitoring assistance program

Statutory guidelines provided in A.R.S. §§ 45-566, 566.01 and 566.02 direct that the following components be included in the Third Management Plan:

- New irrigation water duties for each farm unit
- An alternative agricultural program for Irrigation Grandfathered Right holders
- Additional reasonable reductions in per capita use to those specified in the Second Management Plan
- A Non-Per Capita Conservation Program for municipal providers
- Appropriate conservation measures for individual users on municipal systems
- Conservation or rate-of-use requirements for deliveries of untreated water
- Reasonable conservation requirements for small municipal providers
- Additional economically reasonable requirements for water distribution by cities, towns, private water companies, and irrigation districts
- Conservation requirements for industrial uses based on the use of the latest commercially available conservation technology consistent with reasonable economic return
- A program for additional augmentation of water supplies by AMAs, if feasible, including incentives for artificial groundwater recharge
- Cooperation with the Arizona Department of Environmental Quality in developing a groundwater quality assessment for the AMAs including suggestions for groundwater protection
- A program for conservation assistance to water users
- At the discretion of the director, a program subsequent to January 1, 2006 for the purchase and retirement of grandfathered groundwater rights
- A determination of historic annual net recharge for AMAs in which a groundwater replenishment district is located
- For the Santa Cruz AMA, an evaluation of the potential impact of that AMA's Third Management Plan on the Tucson AMA
- For the Tucson, Phoenix, and Pinal AMAs, advice to the Arizona Water Banking Authority (AWBA) regarding whether storage in the AMA would help achieve the management goal, where such storage should occur, and whether extinguishment of long-term storage credits would help to achieve the management goal for the AMA.

The Department describes in the Third Management Plan the water management issues emerging in the AMA and what programs or changes in statute or rule may be required to resolve these issues. Because the Santa Cruz AMA was created recently, several programs or statute/rule changes may need to be developed during the third management period in order to resolve water management issues at the AMA and local level.

Information is provided throughout the Third Management Plan to explain its development, educate interested individuals regarding the water management issues facing the AMA, and provide information useful in developing future water management policies for the AMA. Throughout the document there are significant policy statements regarding how the Department proposes to manage the AMA's water supplies pursuant to the provisions of the Code and the provisions of the Third Management Plan. The regulatory requirements for water users and water distribution systems are printed in italics for easy reference and are located at the ends of chapters 4 and 5; after each industrial use sector in Chapter 6; and in chapters 8 and 9.

1.7 EMERGING CHALLENGES FOR THE SANTA CRUZ AMA

The 1994 legislation establishing the Santa Cruz AMA called for the development of a comprehensive and well-balanced management strategy reflecting the unique goal and nature of the AMA. The principal

factors making the Santa Cruz AMA unique include: the goal of the Santa Cruz AMA community to protect the limited water resources of the AMA as well as the diverse habitat along the Upper Santa Cruz River, the international nature of the water management issues facing the region, and the need for coordinated water management of surface water rights and groundwater rights to meet the management needs of the area. Challenges facing the AMA include:

- the development, expansion, and maintenance of a database allowing improved understanding of the fluctuating hydrologic conditions present in the AMA
- the development of programs to assure sustainable water supplies
- the settlement of surface water rights claims
- the facilities planning process for the treatment and disposition of wastewater from both sides of the international border
- the protection of core aquatic and riparian habitats
- the sustenance of a healthy economy

Regulatory components include several interrelated programs, such as:

- the Third Management Plan, containing conservation requirements for agricultural, industrial, and municipal users; criteria for assessing the impact of new non-exempt wells on safe-yield and local water tables; and incentives for recharge
- well spacing rules for the impact of new non-exempt wells on the water supplies of current well owners (potentially amended to include criteria specific to the AMA)
- the AWS Rules (amended to include criteria specific to the AMA)
- recharge statutes (potentially amended to include criteria specific to the AMA)
- a surface water rights decree establishing the validity, priority, and quantification of water right claims

Non-regulatory components are also interrelated and include the following:

- a water district or other entity expressly charged to ensure the acquisition and continuous availability of water supplies needed to meet the needs of the AMA water users while maintaining consistency with statutory goals and management objectives
- ongoing hydrologic investigations including the Department's development of surface water and groundwater flow models to be used for projecting the impact of changing supply and diversion conditions and for long-range planning
- an agreement with Mexico regarding the development and management of wastewater treatment facilities and the disposition of the treated water

1.8 CONCLUSION

We have at this time a unique opportunity to resolve several important matters while developing a sound management program for the AMA. Creation of a successful program will depend on the cooperation and commitment of all participants - government entities at local, state, federal, and international levels; water users; water providers; and the community - in refining goals, developing tools, and implementing program features. This complex effort will require several years to complete. The Department is firmly committed to working with interested parties and to dedicating considerable resources to get the job done. We anticipate that several milestones or interim targets will need to be set along the way as we progress.